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10/602,998	06/23/2003	Thomas M. Brennan	28690-705.302	1644

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EXAMINER	
BABIC, CHRISTOPHER M	

ART UNIT	PAPER NUMBER
1637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/602,998	BRENNAN ET AL.	
	Examiner	Art Unit	
	Christopher M. Babic	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4-13;15 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4-13, 15, and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claim(s) 4-13, 15, and 16 are pending. The following Office Action is in response to Applicant's response dated August 1, 2007.

Claim Interpretation

With regard to the claimed system, again it is noted that a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the **intended use** of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone (see *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). In the instant case, the phrase --for amplifying a plurality of target nucleic acids-- is considered an intended use of the claimed structure, and does not incorporate a patentably distinguishable feature.

Furthermore, a similar reasoning applies to the recitation of --releasable forward and reverse primers-- and --releasable sequences complementary to forward and reverse primers--.

First, with regard to the phrases --forward and reverse primers--, they recite **intended uses** of oligonucleotides, i.e. any oligonucleotide capable of hybridization to a complement and extension by an appropriate polymerase can be considered a forward

or reverse primer. In other words, there **necessarily** exists a template oligonucleotide that **can be** amplified by two oligonucleotides capable of extension.

Second, with regard to the term --releasable--, absent any formal structural definition within the specification, the term is given its broadest reasonable interpretation. Thus, any oligonucleotide **capable** of being released from a solid support (e.g. through nuclease digestion) can be considered to be releasable.

Lastly, the phrase --adapted to be released before an amplification reaction-- is not considered to further limit the claimed invention because any oligonucleotide capable of being released is **necessarily** adapted to be released before an amplification process.

Maintained Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim(s) 4-6, 8, 10-13, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Rava et al. (U.S. 5,545,531).

With regard to claim(s) 16, Rava discloses a system (fig. 3-7; col. 7, line 55-col. 11, line 40, for example) comprising: (a) a first solid support wherein (1) the surface of said first solid support comprises a plurality of derivatized areas (fig. 4; col. 8, lines 1-20,

biological chip wafer, for example); (2) at least one releasable forward primer and at least one releasable reverse primer for each target nucleic acid or at least one releasable sequence complementary to said forward and said reverse primers are immobilized on a derivatized area of the first solid support (col. 3, lines 35-50; col. 9, lines 10-25, oligonucleotide probes, for example), wherein said releasable primers or releasable sequences are adapted to be released before an amplification reaction (col. 3, lines 35-50; col. 9, lines 10-25, inherently releasable by nuclease, for example); and (b) a second solid support wherein said second solid support comprises a plurality of wells and each well corresponds to at least one forward and at least one reverse primer for each target nucleic acid (fig. 4; col. 8, lines 1-20, biological chip plate wells, for example).

It is submitted that the above rejection is based on the claim interpretation discussed above. First, the oligonucleotide probes taught by Rava are capable of hybridization to a complement and extension by an appropriate polymerase, and thus, are considered forward and reverse primers. In other words, there **necessarily** exists a template oligonucleotide that **can be** amplified by two oligonucleotides capable of extension. Second, the oligonucleotide probes taught by Rava are **capable of** being released from the biological chip solid support (e.g. through nuclease digestion), and thus, are to be releasable. Lastly, since the oligonucleotide probes taught by Rava are capable of being released from the biological chip solid support, they are necessarily adapted to be released at anytime during any process.

Therefore the entire structure of Rava is capable of performing the intended use of the claimed invention, and thus, is anticipated by the applied teachings.

With regard to claim(s) 4, the oligonucleotide probes taught by Rava (col. 3, lines 35-50; col. 9, lines 10-25, oligonucleotide probes, for example) are necessarily subsequences of a larger polynucleotide.

With regard to claim(s) 5, Rava discloses substrates made of glass (col. 9, lines 25-55, for example).

With regard to claim(s) 6 and 8, Rava discloses covalent immobilization of oligonucleotides through various functionalities such as Si-OH (fig. 8; col. 9, lines 25-65, for example). As noted above, the oligonucleotide probes taught by Rava are capable of being released from the biological chip solid support (e.g. through nuclease digestion).

With regard to claim(s) 10, Rava discloses solid support surfaces with Si-OH functionalities; therefore Rava et al. teach hydrophilic areas (col. 9, lines 50-52, for example).

With regard to claim(s) 11, Rava discloses an example with a feature size of about 100 microns on a side which would give an array with 10,000 probe addresses per 1 cm^2; therefore Rava et al. anticipate a density of derivatized areas of 10 to 10,000 per cm2 (col. 10, lines 38-40, for example).

With regard to claim(s) 12, Rava discloses a probe array size of 0.25 mm^2; therefore Rava et al. anticipate the size of a derivatized area on a solid support that is between 10^{-3} to 5 mm^2 (col. 9, lines 21-24, for example).

With regard to claim(s) 13, Rava discloses a probe array with 105 features; therefore Rava et al. anticipate a number of derivatized areas on a solid support between 10 to 500,000 (col. 9, lines 21-24, for example).

Response to Arguments

Applicant's arguments have been fully considered but they are not persuasive.

First, Applicant argues that Rava does not necessarily teach at least two primers, one forward and reverse, for each target nucleic acid. This argument is not persuasive because, first, the claimed invention **does not require** the presence of a target nucleic acid. Furthermore, for every two oligonucleotides, capable of being extended, there **necessarily** exists an oligonucleotide formation that may be amplified by the two oligonucleotides.

Second, Applicant argues that Rava does not necessarily teach oligonucleotides that are capable of being released at any time during anytime during any process. This argument is not persuasive because the oligonucleotides according to Rava are **necessarily** capable of being released before an amplification process as required by the claimed invention. For example, the probes may be released by nuclease digestions. In yet another example, the probes may be modified by specific chemicals that render specific bases in the probe susceptible to DNA glycosylases (see Boom et al., U.S. 2005/0112590 A1, [0037], for example).

Finally, Applicant argues that Rava does not necessarily teach a second solid support wherein each well corresponds to at least two primers, one forward and

reverse, for each target nucleic acid. This argument is not persuasive because, first, as recited above, the claimed invention **does not require** the presence of a target nucleic acid. Furthermore, for every two oligonucleotides, capable of being extended, there **necessarily** exists an oligonucleotide formation that may be amplified by the two oligonucleotides. Rava teaches wells that surround multiple different oligonucleotide probes (fig. 4; col. 8, lines 1-20, biological chip plate wells, for example).

Applicant is further reminded that the entire structure of Rava is capable of performing the **intended use** of the claimed invention. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Thus, the rejection is maintained.

2. Claim(s) 4-6, 8-13, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Dower et al. (U.S. 5,639,603).

With regard to claim(s) 16, Dower discloses a system (fig. 1; col. 43, line 30-col. 44, line 50, for example) comprising: (a) a first solid support (fig. 1; col. 43, lines 40-50, reaction plate, for example) wherein (1) the surface of said first solid support comprises a plurality of derivatized areas (fig. 1; col. 43, lines 40-50, reaction sites w/ beads, for example); (2) at least one releasable forward primer and at least one releasable reverse

primer for each target nucleic acid or at least one releasable sequence complementary to said forward and said reverse primers are immobilized on a derivatized area of the first solid support (col. 7, line 60-col. 8, line15; col. 30, lines 10-35; col. 42, lines 40-60, oligonucleotide synthesis, for example), wherein said releasable primers or releasable sequences are adapted to be released before an amplification reaction (col. 13, lines 10-35, cleavable linkers, for example); and (b) a second solid support wherein said second solid support comprises a plurality of wells and each well corresponds to at least one forward and at least one reverse primer for each target nucleic acid (fig. 1; col. 43, lines 55-65, reaction chambers, for example).

It is submitted that the above rejection is based on the claim interpretation discussed above. First, the oligonucleotides taught by Dower are capable of hybridization to a complement and extension by an appropriate polymerase, and thus, are considered forward and reverse primers. Second, the oligonucleotide probes taught by Dower are capable of being released from the biological chip solid support (e.g. through nuclease digestion), and thus, are considered forward and reverse primers. Lastly, since the oligonucleotide probes taught by Dower are capable of being released from the biological chip solid support, they are necessarily adapted to be released at anytime during any process.

Therefore the entire structure of Dower is capable of performing the intended use of the claimed invention, and thus, is anticipated by the applied teachings.

With regard to claim(s) 4, the oligonucleotide probes taught by Dower (col. 7, line 60-col. 8, line15; col. 30, lines 10-35; col. 42, lines 40-60, oligonucleotide synthesis, for example) are necessarily subsequences of a larger polynucleotide.

With regard to claim(s) 5, Dower discloses substrates made of glass (col. 11, lines 30-40, for example).

With regard to claim(s) 6, 8, 9 and 15, Dower discloses covalent immobilization of oligonucleotides through various linkers such as photocleavable functionalities (col. 13, lines 20-35, for example).

With regard to claim(s) 10, Dower discloses solid support surfaces with hydrophilic functionalities (col. 13, lines 10-20, for example).

With regard to claim(s) 13, Dower discloses an array with 256 reaction sites; therefore Rava et al. anticipate a number of derivatized areas on a solid support between 10 to 500,000 (col. 43, lines 40-55,for example).

Response to Arguments

Applicant's arguments have been fully considered, but they are not persuasive for the same reasons as recited above (see rejection over Rava).

Maintained Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim(s) 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rava as applied to claim(s) 1, 4-6, 8, and 10-13 above or Dower et al. (U.S. 5,639,603) in view of Monforte (U.S. 5,700,642).

With regard to claim(s) 7, the methods of the previously applied reference(s) have been outlined in the above rejections. The previously applied reference(s) do not expressly teach non-covalent immobilization of oligonucleotides or the use of photocleavable linkages.

It is initially submitted that the attachment of oligonucleotides to solid supports through non-covalent bonds as well as photocleavable linkers was well-known practice within the art.

Monforte provides a supporting disclosure that teaches the attachment of oligonucleotides to solid supports through non-covalent bonds (col. 19, line 60-col. 20, line10). They further teach that non-covalent immobilization is preferred in some instances because the immobilized complex is resistant to extreme reaction conditions (e.g. pH, solvents, etc).

Thus, it would have been *prima facie obvious* to a skilled artisan at the time of invention to attach oligonucleotides to the solid supports of Rava through non-covalent bonds since Monforte suggests such a modification to enhance the resistant to extreme reaction conditions (e.g. pH, solvents, etc) of the immobilized complex is, thus arriving at the claimed invention.

Conclusion

Claim(s) 4-13, 15, and 16 are rejected. No claims are allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Babic whose telephone number is 571-272-8507. The examiner can normally be reached on Monday-Friday 7:00AM to 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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